The Applicant's invention provides several methods to optimize the overall yield of ethylene and propylene from an oxygenate feedstock. An oxygentate is directed to a primary reactor that contains a non-zeolitic molecular sieve catalyst. The product from the primary reactor is then separated into the desired light olefins, i.e., ethylene and propylene, and the undesired heavy hydrocarbon fraction that contains butenes as well as other hydrocarbons "having a molecular weight greater than propane." (Page 2, lines, 15-17) The undesired heavy hydrocarbon fraction is used as feedstock to produce more ethylene and propylene in an olefin cracking process.

There are three ways of optimizing ethylene and propylene in this manner, which are claimed by the Applicant. One, recycle at least a portion of the heavy hydrocarbon fraction to the primary reactor. For this to succeed, the non-zeolitic molecular sieve must perform two catalytic functions, that is, the conversion of the oxygenate to olefin and the cracking of the heavy hydrocarbon fraction to ethylene and propylene. Two, direct at least a portion of the heavy hydrocarbon fraction to a second reactor that contains a second molecular sieve catalyst. The advantage of having a second reactor is that reactions conditions and the type of molecular sieve catalyst can be optimized in each reactor for both oxygenate conversion and heavy hydrocarbon cracking. Three, a combination process of the first two methods, that is, a portion of the heavy hydrocarbon fraction can be recycled to the primary reactor and a portion can be directed to a second reactor.

The Examiner cites three references to reject the Applicant's claims for the three claimed embodiments. GB 2171718 teaches that a zeolite catalyst, particularly a dealuminated, mordenite zeolite can be used to convert an oxygenate to a product containing olefin. The olefin product from this reaction is then separated into ethylene and propylene and a high olefin portion that contains butenes. The high olefin is then recycled back to the oxygenate conversion reactor to produce additional ethylene and propylene. As stated by the Examiner in the Action, GB 2171718 does not disclose the use of a non-zeolitic molecular sieve. The teachings of DE

3524890 are very similar to GB 2171718 with the exception that ZSM-5 is the catalyst used to convert oxygenate to olefin.

Kaiser teaches the use of a non-zeolite, silicoaluminophosphate (SAPO) molecular sieve to convert an oxygenate to a product containing olefin. The desired olefin product contains ethylene, propylene and butenes, and the undesired heavy hydrocarbon fraction contains C_5 and higher hydrocarbons including aromatics. (col. 6, lines 1-7, lines 28-40) There is no suggestion in Kaiser that additional ethylene and propylene can be obtained by recycling butenes for the simple reason that butenes are one of the desired olefins. Kaiser also does not disclose that non-zeolitic molecular sieve, particularly SAPO molecular sieve, can be used to convert a heavy hydrocarbon fraction to additional ethylene and propylene.

The Examiner fails to establish a *prima facie* case of obviousness because the combination of cited references does not teach or suggest all the limitations of the claimed invention. In particular, none of the cited references teaches or suggests that non-zeolitic molecular sieve, particularly SAPO molecular sieve, can be used to convert heavy hydrocarbon to ethylene and propylene. In rejecting Applicant's claims directed to recycling an undesired heavy hydrocarbon fraction the Examiner makes an improper assumption that it was known or suggested in the prior art at the time of the invention that non-zeolitic molecular sieve could convert heavy hydrocarbon to ethylene and propylene. The fact that zeolitic molecular sieves were known to convert heavy hydrocarbon to ethylene and propylene does not create a *prima facie* case of obviousness. The Examiner is not permitted to substitute one type of molecular sieve catalyst with another type without any suggestion in the art to do so.

In regard to Applicant's claims directed to using a second reactor to convert a heavy hydrocarbon fraction to ethylene and propylene, the Examiner again fails to establish a *prima facie* case of obviousness because none of the cited references expressly or impliedly suggest the claimed combination. "Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination." *In re Geiger*, 688 U.S.P.Q. 2d 1276, 1278 (Fed. Cir. 1987). Using

the applicant's disclosure as a blueprint to reconstruct the claimed invention from isolated pieces of the prior art contravenes the statutory mandate of section 103. See *Grain Processing Corp. v. American Maize-Prods. Co.*, 5 U.S.P.Q. 2d 1788, 1792 (Fed. Cir. 1988).

The Examiner's argument in this case is base upon superimposing GB 2171718 or DE 3524890 with that of Kaiser to arrive at Applicant's invention. The Examiner's argument is as follows. Because it was known at the time of the invention that non-zeolitic molecular sieves could convert an oxygenate to a product containing olefin, and zeolitic molecular sieves could convert heavy hydrocarbon to ethylene and propylene, then it it would be obvious to one skilled in the art to use SAPO as the oxygenate conversion catalyst and use a zeolite in a second reactor to convert the heavy hydrocarbon fraction. However, none of the cited references expressely or impliedly suggest such a combination. In fact, such a suggestion is absent for the simple reasons that GB 2171718 or DE 3524890 do not discuss non-zeolitic molecular sieves and Kaiser does not discuss use of a second reactor. Therefore, the superimposition of the two references to arrive at Applicant's invention is one of fiction produced by the "insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against the teacher." *In re Dembiczak*, 50 U.S.P.Q.2d 1614, 1618 (Fed. Cir. 1999), quoting *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983)

The Examiner also rejected claims 43, 44, 47 and 48 under 35 USC 103(a) as being unpatentable over GB 2171718 in view of Kaiser and in further view of DE 3524890. This rejection is traversed. For the reasons stated, the addition of DE 354890 does not overcome the deficiencies of the two other references.

It is respectfully submitted that the above Amendment removes all issues of patentability before the Examiner. Accordingly, entry of this Amendment and favorable reconsideration is requested.

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the

cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing docket no. 357972004600. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Respectfully submitted,

Dated: September 27, 2000 By: _____

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